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Climate Action Plans Under Climate-Resilient Urban Policies

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ABSTRACT

Climate change, which is among the biggest environmental problems of today, affects the lives of all living things economically, socially, and environmentally, both in the city and on a global scale. Especially in the climate change process, which has inevitable effects on urban systems and population, action plans come to the fore within the framework of the concepts of climate resilience and vulnerability. Thanks to these plans, mitigation and adaptation policies are produced against negative situations that arise or are predicted to occur in cities. The effects of climate change on each city are different. In this context, it is an important requirement for urban actors to determine their degree of combating the effects of climate change and their adaptation capacities in cooperation.

This study, it was aimed to evaluate successful climate action plans in the world and in Turkey in the process of combating climate change. In this context, first of all, successful climate action plans were determined and examined by literature review. Then, common policies and strategies were determined and suggestions were developed to prepare the ground for the climate change struggle processes of other cities.

Anahtar Kelimeler:
İklim değişikliği,
İklime dirençlilik,
İklim eylem planları,
Azaltım,
Uyum.

ÖZ

Günümüzün en büyük çevre sorunları arasında olan iklim değişikliği hem kent hem de küresel ölçekte ekonomik, sosyal ve çevresel açıdan bütün canlıların yaşamlarını etkilemektedir. Özellikle kentsel sistemler ve nüfus üzerinde kaçınılmaz etkileri olan iklim değişikliği sürecinde, iklime dirençlilik ve kırılganlık kavramları çerçevesinde eylem planları ön plana çıkmaktadır. Bu planlar sayesinde, kentlerde ortaya çıkan veya çıkması öngörülen olumsuz durumlara karşı azaltım ve uyum politikaları üretilmektedir. İklim değişikliğinin her kent üzerinde etkileri farklı olmaktadır. Bu kapsamda kentsel aktörlerin işbirliği içerisinde iklim değişikliğinin etkileri ile mücadele edebilme derecelerini ve uyum kapasitelerini belirlemeleri önemli bir gerekliliktir.

Yapılan bu çalışmada iklim değişikliği ile mücadele sürecinde Dünya'da ve Türkiye'de başarılı iklim eylem planlarını değerlendirmek amaçlanmıştır. Bu bağlamda, ilk olarak literatür taraması yapılarak başarılı iklim eylem planları tespit edilmiş ve irdelenmiştir. Ardından ortak politikalar ve stratejiler belirlenerek diğer kentlerin iklim değişikliği mücadele süreçlerine zemin hazırlamak amacıyla öneriler geliştirilmiştir.

1. Introduction

In recent years, many problems have been emerging in cities, especially as a result of rapid urbanization and population growth, as well as the impact of climate change [1-4]. Environmental pollution and air pollution are the main problems that arise in cities, and these problems also reduce people's quality of life levels [5-11]. In this context,

international concerns are also growing about how to address the effects of climate change on cities [12-14]. It is predicted that climate change will negatively affect the inhabitants of cities, the ecosystem of cities, their physical environment, infrastructure and economy. In line with these growing concerns about the future, it is more effective to see this problem as "creating resilience of cities" rather than focusing on different measures to adapt to climate risks [12].

Resilience is a concept used in many disciplines. The Intergovernmental Panel on Climate Change (IPCC) defines the concept of resilience as "the ability of an ecological or social system to destroy negative situations while maintaining the same basic structure, ways of functioning, the potential to adapt to any situation and change" [15]. The concept of resilience, which is used in many different fields, can be expressed as a response to climatic events and environmental threats, especially in the field of urban and planning [12-16]. In this context, climatic resilience is used to find solutions to the problems caused by climate change and its negative effects within the framework of sustainability [12, 17, 18].

Today, climate change is considered one of the biggest environmental problems in the whole world [19-21]. At the heart of this problem is the beginning of human-caused activities and the phenomenon of urbanization that it brings with it plays an important role. There is a long-standing consensus that carbon emissions produced by humans affect the climate around the world with potentially devastating consequences [22, 23]. According to the Fifth Assessment Report (AR5) published by the Intergovernmental Panel on Climate Change (IPCC) in 2014, urbanization has been evaluated as a global trend worldwide [24]. According to the same report, while 13% of the world's population lived in cities in the 1900s, more than half of the world's population lives in cities today, and by 2050, this rate is expected to be 64-69% [25].

Rapidly growing urban areas are faced with increasing air and water pollution, floods and overflows, heatwaves, and serious climatic risks depending on these conditions [26, 27]. The magnitude of these risks that urban areas face is different for each city and region. Urban population growth, on the other hand, will increase the global greenhouse gas emissions of cities, if necessary precautions are not taken [28, 29]. It is an important requirement to determine how much the cities can be damaged in the face of these dangers and to be prepared for the negative situations that the city and the people living there will experience in the process of combating climate change in the future [20].

The socio-economic and environmental impacts of climate change vary according to the level of development of countries and, most importantly, the level of vulnerability of cities. Therefore, it is of great importance to determine the issues such as which climate change risks all cities face or will face on a local scale, the situation of producing greenhouse gases due to the morphological characteristics of cities, and the strength of resistance to climate change are of great importance. In the process of combating climate change, "reduction and adaptation" policies come to the fore. Especially in recent years, the integration of mitigation and adaptation policies with urban planning to build cities that are more resilient to the risks of climate change, and accordingly, the necessity of land use planning that will support adaptation to the effects and threats of climate change are among the important issues [30].

Reduction; It is expressed as the work done to minimize the speed and size of greenhouse gas emissions as a result of human-induced activities [31, 32]. Rapport; Coping with the situations caused by climate change is explained as minimizing the climate impact with regulations in ecological, economic, and social areas [31, 33]. While the results of human-based activities come to the forefront in mitigation studies and the effects of these situations are in question, there is a holism in harmonization studies. Therefore, the most effective method of combating the negative effects of climate change on a global scale is adaptation studies. Solution methods determined within the scope of harmonization studies at a local scale are more likely to be effective since all segments of the society are approached holistically [33]. In the last 20 years, there has been a rapid increase in the development of adaptation policies in the fight against climate change worldwide [34, 35]. In the implementation of these policies, there is very little consensus on which ones are counted as effective adaptation processes. The most important reason for this situation is that policies and initiatives are proposed and planned but rarely implemented [36].

Responding to climate change is seen as the greatest environmental and economic challenge of our time. In the stage of finding a solution to this difficulty, it is an important problem that there are major deficiencies in the implementation of policies. The main reason for this problem is that practitioners do not clearly understand what works and what does not work [23]. Although various studies have been carried out to combat climate change on an international and national scale, the desired level has not been reached [21]. In this context, the issue of what cities can do against the

problem of climate change is being discussed. The World Bank declared the problem of climate change as an "urgent agenda item" during this struggle [37]. With the effect of rapid urbanization and climate change, the increasing pressure in urban areas causes an increase in environmental problems [3, 38-42]. In this context, within the scope of the study, the successful projects in the fight against climate change in the world and in Turkey, have been compared and suggestions have been developed.

1.1 Climate Change Fighting Process in the World

The process of combating climate change on an international scale has been on the world agenda since the 1970s. The most important application made in this process is the "UN Framework Convention on Climate Change (UNFCCC)", which was adopted by the United Nations (UN) at the Rio Conference in 1992. The Convention aims to reduce greenhouse gas emissions, which are the causes of climate change. The Kyoto Protocol, which was accepted in 1997, brought binding emission reduction or limitation commitments to the EU and industrialized countries, which are responsible for greenhouse gas emissions [43].

In 1990, the “Local Governments for Sustainability (ICLEI)” community was established in New York. This official community, which was established, accelerated the process for the implementation of the “Cities for Climate Protection” project in 1993. ICLEI has proposed a 5-stage process model for cities to implement a successful climate policy at the local scale (Table 1) [37].

Table 1. Process model proposed by ICLEI for climate policy

MITIGATION	ADAPTATION
1. Establishing and estimating a reference emissions inventory	1. Identifying the effects of climate change (evaluating vulnerability, opportunity and resilience)
2. To set an emission reduction target for the forecast year.	2. Identify relevant compliance strategies
3. Developing a local action plan	3. Identifying priority action areas and developing a local action plan
4. Implementing policies and measures	4. Implementing policies, system improvements and compliance measures
5. Monitoring, verifying and reporting results	5. Monitoring, evaluating and reporting results

Sample plans that have been successful in combating climate change on a local scale around the world are given in Table 2.

Table 2. Successful climate action plans in the World

PLAN	PLAN CONTENT	PLAN TARGETS
Portland Climate Action Plan, 1993	Energy-saving	◗ Carbon dioxide emission reduction ◗ Ensuring energy savings for the municipality
Freiburg Climate Protection Plicy, 2007	Climate change awareness and energy savings	◗ Greenhouse gas emission reduction
Seattle Climate Action Plan, 2013	Energy-saving	◗ Fuel-saving ◗ Energy efficiency in buildings ◗ Greenhouse gas emission reduction
Pennsylvania Climate Action Plan, 2018	Energy-saving	• Energy-saving • Greenhouse gas emission reduction

Portland (USA, Oregon State) is one of the municipalities that highlighted the energy-saving potential in public buildings in the fight against climate change between 1990 and 2000, and thus will be listed among the important examples in the struggle process [37-44-45]. Portland prepared its climate action plan in 1993. The goals of the plan

include reducing carbon dioxide emissions (115,000 tons in 10 years) as well as providing energy savings ($9.6 million) to the local government [46].

The city of Freiburg (Germany) succeeded to be one of the greenest cities in Europe in 1996, thanks to its clean energy policies and the work it has done in this direction. The local government in the city has halved the share of nuclear electricity since 1996, ensuring that approximately 50% of the city's electricity and heating needs are met from power plants and combined heat [45, 47]. Today, the city of Freiburg aims to reduce greenhouse gas emissions (40%) by 2030. At the same time, the Freiburg local government has a successful initiative called the "Carbon Dioxide Diet Program (CO2 Diet Programme)", which aims to increase the awareness of the public in the fight against climate change [48].

With the "Kyoto Movement" initiated by the Seattle Municipality (USA, Washington State) in the United States, a large number of mayors signed the "Climate Protection Agreement". In this way, municipalities have put into effect the emission reduction targets required by the Kyoto Protocol in their cities and accelerated the process for governments to take action. In the process, the "Climate Protection Center" was established with the cooperation of municipalities. This center has been a guide for local governments to take appropriate steps for the use of renewable energy sources in all buildings in cities, starting with green building, green transportation, and energy-saving practices, especially climate programs, and buildings belonging to official institutions [45-49]. During this period when local governments were active in climate change, a city climate action plan was prepared by the City of Seattle. Within the scope of the plan, projects such as the establishment of a "Green Building Special Team" were implemented in order to save fuel (40%) in the city center and save energy in buildings (20%) with electric vehicles. The main goal of the Seattle Climate Action Plan is to reduce the city's 1990 level greenhouse gas emissions by 7% by 2012. This target was achieved in 2005. The Seattle local government, which is still determined in the fight against climate change, has set a long-term goal in 2011 for the people to adopt a "zero-carbon lifestyle" by 2050. In order to achieve this goal, the Seattle Climate Action Plan was revised and prepared again in 2013. Within the scope of the plan, strategies for reducing greenhouse gas emissions in the city and adapting to the effects of climate change, including social policies, were determined. Most of the targets in the plan were achieved before 2015 [50].

Another city that has been successful in the process of combating climate change is Pennsylvania. The "Climate Change Act" was signed into law by the local government of Pennsylvania in 2008. After the law was adopted, an Advisory Committee on Climate Change was established to prepare a plan to reduce greenhouse gas emissions in the region. In the plan, mitigation strategies have been determined in many areas. Improvements have been made in energy efficiency, especially in reducing greenhouse gas emissions. The plan also aims to achieve economic savings [51].

1.2 Climate Change Fighting Process in Turkey

In the process of combating climate change, Turkey also joined the Framework Convention on Climate Change in 2004 and the Kyoto Protocol as a party in 2009 without binding reduction obligations. Processes of climate change action plans on a local scale began in the 2000s [37]. The successful plans made in the process of combating climate change on a local scale in Turkey are given in Table 3.

Table 3. Successful climate action plans in Turkey

PLAN	PLAN CONTENT	PLAN TARGETS
Gaziantep Climate Action Plan, 2011	Energy sector	• Carbon reduction • Establishing a climate change institution in the city • Promoting and supporting low-carbon Technologies in economic sectors
İstanbul Climate Action Plan, 2018	Carbon reduction	• Making low emission projects • Establishment of carbon market at local scales • Targets on how the city can concretely reduce its climatic vulnerability and reduce the city's emissions. • During the process, it was aimed to carry out important studies that are the basis for Istanbul's climate action plan and the source of the main plan.
Bursa Climate Action Plan, 2017	Sustainable energy and adaptation to climate change	• Conducting vulnerability analysis on various thematic issues at city scale • After these analyzes, strategies and actions are determined.

Kocaeli Climate Action Plan, 2018	Energy-saving	• Greenhouse gas emission reduction. • Final reduction targets according to the Greenhouse Gas Inventory

Gaziantep is the first Metropolitan city in Turkey to prepare a local Climate Change Action Plan [45-52]. The plan, which is focused on the energy sector, is an important exemplary initiative in terms of local implementation of Turkey's National Action Plan on Climate Change and the Climate Change Strategy Document. The carbon reduction target (15%) announced in the plan for 2023 is the first reduction target set on a local scale in Turkey [53].

In 2015, the greenhouse gas inventory of electricity, natural gas, transportation, waste, and other fuels in Istanbul was renewed. In the period between 2015-2018, necessary steps were taken for the "Istanbul Climate Change Action Plan". The basic elements of the plan, which can evaluate risks and opportunities related to climate and support capacity-building activities and participation of stakeholders, within the framework of climate change "mitigation" and "adaptation" principles, have been completed within the cooperation of Istanbul Environmental Management Industry and Trade Inc. and Istanbul Metropolitan Municipality [45-54]. The plan includes strategies and targets for low-emission projects, the creation of local carbon markets, and how to reduce the city's vulnerability to the effects of climate change in the long term (Istanbul Climate Action Plan, 2018).

Bursa's climate change plan includes sustainable energy strategies as well as climate change adaptation strategies. In this respect, the plan is among the important climate action plans in Turkey as an integrated climate action plan model. The part of the plan that includes the climate change adaptation strategies was prepared in cooperation with the “European Environment Agency” [45-54]. In the plan, there are strategies and targets made in this direction by making vulnerability analyzes on many thematic issues such as the urban heat island effect, urban water areas, green areas in terms of physical planning at the urban scale [56].

Kocaeli Climate Change Action Plan was completed in 2018 within the scope of a project financed from EU grant funds [33-45]. The plan is based on 2 basic reports as “Climate Change Action Plan and Greenhouse Gas Inventory”. In the emission-oriented plan, it is aimed to reduce greenhouse gas emissions [57].

3. Conclusion and Suggestions

The borderless nature of environmental problems, which is one of the important components of the agenda at the summit meetings, poses a great threat both for cities and for humanity. The problems, which have been increasing since the past, started to be felt more intensely after the industrial revolution. Recently, environmental problems such as global warming and climate change are problems that require international cooperation in order to meet the needs of future generations. In the study, successful plans in the fight against climate change in the world and in Turkey were examined. In this context, it has been determined that an approach focused on “reduction” is at the forefront of climate action plans. Cities have adopted measures to reduce the amount of greenhouse gas emissions, especially within the framework of the principle of energy efficiency. The most important aim of all these plans is to create “climate-friendly resilient cities”. Considering the plans examined within the scope of the study, the suggestions developed for cities to be successful in the fight against climate change on a local scale are as follows:

- Despite the efforts of the UN especially after 1990, the measures taken by the states did not contribute to limiting the negative consequences of climate change or reducing it to the level that scientists consider safe. Therefore, there is a need for more international cooperation and transparent information sharing in the following processes.

- Sensitivity to climate change is quite high, especially in developing cities, where there is rapid and unplanned urbanization, and where the quality of life of the urban population is not high. These cities need to be prepared and resilient in order to reduce the risks against the negative consequences of climate change and to ensure the health, quality of life, and safety of people.

- In the process of combating climate change on a local scale, it is seen that mitigation policies are emphasized all over the world. In the reduction policies, areas such as transportation, energy, wasteland use, and urban planning come to the fore. Among these areas, the sector that cities prioritize is the energy sector. “Energy efficiency (reducing carbon dioxide emissions)”, which is prominent in most of the plans examined, is important both in terms of climate change policies and in terms of reducing energy costs. In this context, public vehicles in urban transportation sectors should be renewed and developed according to energy efficiency. Emphasis should be placed on policies and designs that encourage and enable walking and cycling.

- In local waste policies, measures such as reuse and recycling of waste come to the fore. In the field of urban planning, standards suitable for energy efficiency should be developed, especially for new buildings and neighborhoods to be established.

- Adaptation policies at the local scale are relatively new in the fight against climate change. In addition to the planning approach used in reduction policies based on carbon emission reduction, integrated adaptation policies should be produced by considering the current trend of the world.

- It is an important requirement to create risk action plans and create risk maps within the framework of climate change forecasts and predictions for cities. It is necessary to consider climate resilience in the plans and studies and to develop plan decisions for reducing or balancing greenhouse gas emissions

- For cities in the world and Turkey to gain resilience and adapt to unexpected developments arising from climate change, it is necessary to ensure that fragile areas (industry, housing, etc.), sectors (industry, energy, transportation, etc.), and values (natural and cultural values) are comprehensively evaluated. Compliance plans should be prepared by making analyzes in a way. In these plans, holistic plan decisions should be taken by considering transportation, infrastructure, and access to services, water management, drought risk management, food safety, and public health issues.

Possible developments to be made in the next process in the fight against global climate change should be followed up and analyses should be widespread. In this process, all countries, especially developed countries, should take responsibility for climate change. Local governments in Turkey have significant potential in terms of mitigation and adaptation measures. With renewable energy, energy efficiency, waste management, transportation, and urban planning powers, local governments stand out in the goal of climate resilience in Turkey. In the decisions to be made in this context, sustainability-based principles should be determined using a human and ecology-oriented approach, resource values should be used effectively, and stakeholders producing information should be supported.

Competing Interest / Conflict of Interest
The authors declare that they have no competing interests.

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